

REMARKS

Applicant acknowledges with appreciation the thorough examination of the present application as evidenced by the first Official Action. Claims 1-17 are pending in this application. Of these, the Official Action objects to Claim 1 for informalities related to the phrase "if necessary." Claim 1 has been amended to remove the phrase "if necessary." Accordingly, Applicant respectfully submits that the objection of Claim 1 is overcome.

The Official Action rejects Claim 1, 15, 16, and 17 under 35 U.S.C. § 112, second paragraph, for allegedly being indefinite. More particularly, the Official Action asserts that the recitation of "said light is comprised of at least some of the spectral frequencies which make up the Fourier transform of said short pulse to be emulated" renders Claim 1 unclear and further that the phrase "said short pulse to be emulated" lacks sufficient antecedent basis. In this regard, Claim 1 has been amended to remove the phrase "to be emulated." Further, Claim 1 has been amended to recite "short optical pulse" instead of "short pulse." In this regard, the short optical pulse that exits the medium can be expressed in terms of its Fourier transform. The Fourier transform is comprised of a range of frequencies and the feature requires that the modulated beam of light comprise at least some of these frequencies. No new matter has been added by way of these amendments. Accordingly, Applicant respectfully submits that the rejection of Claim 1 is overcome.

Additionally, the Official Action asserts that the recitation of "said object or objects embedded in an optically turbid medium" in Claims 15 and 16 lacks antecedent basis and that it is unclear whether the "optically turbid medium" recited in Claims 15 and 16 corresponds with the "medium" recited in Claim 1. In this regard, Claims 15 and 16 have been amended to recite "an object" instead of "said object" to provide sufficient antecedent basis and recite "optically scattering medium" instead of "optically turbid medium" for clarity. No new matter has been added by way of these amendments. Accordingly, Applicant respectfully submits that the rejection of Claims 15 and 16 is overcome.

Further, the Official Action asserts that Claim 17 omits essential structural cooperative relationships of elements and that the phrase “optional optical elements means” is allegedly indefinite. Claim 17 has been canceled and accordingly, Applicant respectfully submits that the rejection of Claim 17 is moot.

Accordingly, Applicant respectfully submits that the rejections of Claim 1, 15, 16, and 17 under 35 U.S.C. § 112, second paragraph is overcome.

The Official Action rejects Claims 1, 2, 10-13, 15, 16 under 35 U.S.C. §102(b) as anticipated by Arons and Dilworth’s *Analysis of Fourier synthesis holography for imaging through scattering materials* (hereinafter the “Arons document”). The Official Action also rejects Claims 1, 3-7, 10, and 14 under 35 U.S.C. §102(e) as anticipated by U.S. Patent No. 6,456,380 to Naganuma (hereinafter the “Naganuma ‘380 patent”). Further, the Official Action rejects Claim 17 under 35 U.S.C. §102(e) as anticipated by Zhang and Lilge’s *Frequency-domain near infrared spectroscopy instrumentation* (hereinafter the “Zhang document”). Finally, the Official Action rejects Claims 8 and 9 under 35 U.S.C. §103(a) as unpatentable over the Naguma ‘380 patent in view of U.S. Patent No. 6,853,455 to Dixon et al. (hereinafter the “Dixon ‘455 patent”).

Independent Claim 1 and dependent Claims 15 and 16 have been amended as discussed above. Further, some of the steps in Claim 1 have been amended and additional steps have been included to further clarify the claimed invention and further patentably distinguish the claimed invention over the cited references. Support for these amendments can be found, for example, at paragraph 0017 of the published application. No new matter has been added by way of these amendments. In light the remarks presented herein and the foregoing amendments, Applicant respectfully requests reconsideration of the present application and prompt allowance of all the claims.

Initially, Applicant notes that Claim 17 has been canceled and as such, Applicant respectfully submits that the rejection of Claim 17 is moot.

Independent Claim 1 is directed to a method of determining the optical temporal response of an optically scattering medium to a short optical pulse that is determined by making measurements using only a single beam of light. In this regard, the method of the claimed invention is non-interferometric and as such does not require the use of a reference beam in addition to the beam that passes through the medium, and requires only one scan from which the relative amplitude and phase can be determined. Moreover, the single beam is modulated.

The Arons document discloses a holographic method for determining the response of the medium. In contrast to the claimed invention, holographic methods, by their very nature, are based on the interference of two separate optical beams. Further, the method described by the Arons document requires two separate scans, the first being a wavelength scan and the second being a time delay scan, in order to determine the amplitude and the phase of the spectral components. Moreover, the Arons document discloses a method that does not utilize modulated light. As such, Applicant respectfully submits that the Arons document teaches an interferometric method, which requires the use and interaction of two light beams.

In this regard, the requirements for simultaneous measurement of two light beams, one of which passes through the scattering medium and thereby insures the necessary stability of the optical system, are inherently more complex than that of a single beam as provided in the claimed invention. For at least the foregoing reasons, Applicant respectfully submits that the Arons document fails to teach or suggest a non-interferometric method utilizing a single beam of modulated light as recited in independent Claim 1 and therefore, that Claim 1 and the claims dependent therefrom, namely Claims 1-16, are patentably distinct from and not anticipated by the Arons document. Accordingly, the rejection of Claims 1, 2, 10-13, 15, 16 under 35 U.S.C. §102(b) is overcome.

Similarly, the Naganuma '380 patent discloses the use of interferometry to measure phases. Accordingly, the Naganuma '380 patent does not teach or suggest the use of a single beam passing through the medium without the use of other auxiliary reference beams as provided in the claimed invention. As mentioned above with respect to the Arons document, the

requirements for simultaneous measurement of two light beams, one of which passes through the scattering medium and thereby insures the necessary stability of the optical system, are inherently more complex than that of a single beam. As such, Applicant submits that the Naganuma '380 patent fails to teach or suggest the use of a single beam of light to determine the relative amplitude and phase change of the spectral components with respect to the laser beam. For at least the foregoing reasons, Applicant respectfully submits that the Naganuma '380 patent fails to teach or suggest a non-interferometric method utilizing a single beam of modulated light as recited in independent Claim 1 and therefore, that Claim 1 and the claims dependent therefrom, namely Claims 1-16, are patentably distinct from and not anticipated by the Naganuma '380 patent. Accordingly, the rejection of Claims 1, 3-7, 10, and 14 under 35 U.S.C. §102(e) is overcome.

As discussed above, the Naganuma '380 patent discloses the use of interferometry to measure phases and therefore does not anticipate independent Claim 1 and the claims dependent therefrom, namely Claims 1-16. Similarly, the Dixon '455 patent also teaches an interferometric method for performing a spectral analysis. Accordingly, the Dixon '455 patent fails to overcome the deficiencies of the Naganuma '380 patent with respect to independent Claim 1 and the claims dependent therefrom. As such, the combination of the Naganuma '380 patent and the Dixon '455 patent necessarily teaches an interferometric method and fails to teach or suggest a non-interferometric method utilizing a single beam of modulated light as recited in Claim 1. For at least the foregoing reasons, Applicant respectfully submits that the Naganuma '380 patent and the Dixon '455 patent, taken individually or in combination, fail to teach or suggest a non-interferometric method as recited in independent Claim 1 and therefore, that Claim 1 and the claims dependent therefrom, namely Claims 1-16, are patentably distinct from and not rendered obvious by the Naganuma '380 patent and the Dixon '455 patent. Accordingly, the rejection of Claims 8 and 9 under 35 U.S.C. §103(a) is overcome.

As discussed above, none of the cited references teaches or suggests a non-interferometric method as recited in the claimed invention. For at least the foregoing reasons,

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Applicant respectfully submits that the claimed invention is patentably distinct from the cited references and that pending Claims 1-16 are allowable.

Consideration Of Previously Submitted Information Disclosure Statement

It is noted that an initialed copy of each of the PTO Forms 1449 that were submitted with Applicant's Information Disclosure Statement filed November 7, 2005 have not been returned to Applicant's representative with the present Office Action. Although an initialed copy of each of the PTO Forms 1449 were returned with the Office Action of December 13, 2007, the Examiner indicated that the Office Action of December 13, 2007 be disregarded. Accordingly, it is requested that an initialed copy of each of the PTO Forms 1449 be forwarded to the undersigned with the next communication from the PTO, unless the Examiner indicates in the next communication that the initial copy of each of the PTO Forms 1449 returned with the Office Action of December 13, 2007 should not be disregarded and do constitute consideration of Applicant's Information Disclosure Statement filed November 7, 2005. The *List of References Cited by Applicant and Considered by Examiner* is available in PAIR. Any copies of the cited references that were necessary for consideration of the Information Disclosure Statement were provided at the time of filing the original Information Disclosure Statement. Applicant will be pleased to provide additional copies of the references upon the Examiner's request if it proves difficult to locate the original references.

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CONCLUSION

In view of the amendments and remarks presented above, it is respectfully submitted that all of the claims of the present application are in condition for immediate allowance. Applicant therefore respectfully requests that a Notice of Allowance be issued. The Examiner is encouraged to contact the Applicant's undersigned attorney to resolve any remaining issues in order to expedite examination of the present application.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



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